

# PATENT SPECIFICATION



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## COMPLETE SPECIFICATION

### Improvements in Blowing Cores for Castings

We, THE STANTON IRONWORKS COMPANY LIMITED, a British Company, of P.O. Box No. 3, Near Nottingham, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

In the operation of core blowing, sand is driven from a vessel in a stream of air into a core box beneath, from which the air can escape through narrow vents while the box becomes filled with sand. The sand includes a binder which is later hardened by baking the core in an oven. Considerable difficulty is experienced in causing the sand to flow freely from the vessel. There is a tendency for the air to form "pipes" in the sand and then to flow into the core box without entraining further sand. In various core blowers at present in use, this difficulty is countered by admitting the air into the vessel through a large number of small openings and by providing a stirrer to agitate the sand. However, the stirrers so far provided have been complicated and have agitated only a part of the sand in the vessel.

According to the present invention, the vessel has one or more rotary stirrers on horizontal rotary shafts which each pass completely across the vessel, the arrangement being such that substantially all the sand in the vessel is agitated by the stirrers.

In many core blowers the sand in the vessel is replenished from a hopper, there being some means for cutting off the vessel from the hopper while air is being blown into the vessel. Preferably in core blowers having stirrers according to this invention in the vessel, there are one or more similar stirrers in the hopper.

The accompanying drawing shows one example of apparatus according to the present invention. The drawing is a vertical section through the hopper, vessel and core box.

In the apparatus core supports 2 in the

form of flat plates are fed successively from a stack 4 onto a platform 6 which is then raised to carry the core support into register with the open bottom of a core box 8 in which are two annular spaces 10 and 12 each defining the shape of a tubular core. Sand flows from a hopper 14 into a vessel 16 and is then blown from the vessel into the spaces 10 and 12. Air is released from the vessel 16 and then the core support is lowered taking the newly formed cores with it. Finally the core support is pushed sideways by the next following core support and runs on to a conveyor from it can be removed.

The hopper 14 contains two stirrers in the form of fingers 33 and 35 projecting from two rotary shafts 34 and 36 which are connected by gearing 38 and driven by a chain 40 from a motor (not shown). The vessel 16 likewise has two stirrers on rotary shafts 42 and 44 connected together by gearing 46 and driven by a chain 48 from a motor (not shown). Between the hopper 14 and the vessel 16 there is a sluice valve 50 controlled by a piston 52 in a pneumatic cylinder 54.

A port 56 in the vessel is connected by a short pipe 58 to a tube of gauze 60 surrounded by a chamber 62. A pipe 64 is connected to the other end of the tube of gauze and a pipe 66 is connected to the chamber 62. A multiple piston valve 68 serves alternatively to connect the pipe 66 to atmosphere and to connect the pipe 64 to a compressed air supply.

The sand passes from the vessel 16 into the annular spaces 10 and 12 through ports 72 and air escapes from the annular spaces through vents 47 and ports 76. The stripping of the core is assisted by pneumatically operated vibrators 78.

In the apparatus shown in the drawings, the vessel has a flat bottom. If the sand to be used is very sticky, then the vessel may have a spherical bottom. The vessel may be rectangular rather than circular in horizontal cross-section, in which case the stirrers are correspondingly rectangular in outline. Here again,

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the bottom may be flat or semi-cylindrical.

Other forms of stirrer may be used. For example, in a cylindrical vessel each stirrer may be in the form of half hoops having a radius a little less than the vessel and fixed opposite one another with the shaft lying along a diameter of the half hoops.

What we claim is:—

1. Apparatus for blowing cores for castings, including a vessel from which sand is driven in a stream of air into a core box beneath, and one or more rotary stirrers on horizontal rotary shafts which each pass completely across the vessel, the arrangement being such that substantially all the sand in the vessel is agitated by the stirrers.

2. Apparatus according to claim 1 in which the vessel is a cylinder with its axis vertical and the rotary shafts are parallel and on diameters at different levels.

3. Apparatus according to claim 1 or claim 2 including a hopper from which sand can

flow to replenish the vessel, and one or more further rotary stirrers on horizontal rotary shafts which each pass completely across the hopper, the arrangement being such that substantially all the sand in the hopper is agitated by these further stirrers.

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4. Apparatus according to any of claims 1 to 3 in which each stirrer consists of fingers projecting in opposite directions in a common plane from the rotary shaft.

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5. Apparatus according to claim 1 in which the vessel and the stirrers in it are substantially as described with reference to the accompanying drawing.

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6. Apparatus according to claim 5 in which the hopper and the stirrers in it are substantially as described with reference to the accompanying drawing.

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#### PROVISIONAL SPECIFICATION

#### Improvements in Blowing Cores for Castings

We, THE STANTON IRONWORKS COMPANY LIMITED, a British Company, of P.O. Box No. 3, near Nottingham, do hereby declare this invention to be described in the following statement:—

In the operation of core blowing, sand is driven from a vessel in a stream of air into a core box from which the air can escape through narrow vents while the box becomes filled with sand. The sand includes a binder which is later hardened by baking the core in an oven. Considerable difficulty is experienced in causing the sand to flow freely from the vessel. There is a tendency for the air to form "pipes" in the sand and then to flow into the core box without entraining further sand. In various core blowers at present in use, this difficulty is countered by admitting the air into the vessel through a large number of small openings and by providing a stirrer to agitate the sand. However, the stirrers so far provided have been complicated and have agitated only a part of the sand in the vessel.

According to one feature of the present invention, the vessel has one or more rotary stirrers on horizontal rotary shafts which each pass completely across the vessel.

In one simple arrangement the vessel is cylindrical with its axis vertical, and there are two parallel rotary shaft on diameters at different levels. Each shaft carries a stirrer in the form of half hoops having a radius a little less than the vessel and fixed opposite one another with the shaft lying along a diameter of the half hoops. The shafts are geared together to turn at the same speed in the same sense, with one pair of half hoops

passing through a vertical plane while the other pair are passing through a horizontal plane, the paths of the stirrers just intersecting without the stirrers fouling one another. Air is admitted through a port in the cylindrical wall of the vessel near the top.

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If the sand is very sticky then the vessel may have a spherical bottom, but otherwise may have a flat bottom. The vessel may be rectangular rather than circular in horizontal cross-section, in which case the stirrers are correspondingly rectangular in outline. Here again, the bottom may be flat or semi-cylindrical. The stirrers may be of more complex form, for example, with additional radial bars, or with half-hoops of differing radius.

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In many core blowers the sand in the vessel is replenished from a hopper, there being some means for cutting off the vessel from the hopper while air is being blown into the vessel. Preferably in core blowers having stirrers according to this invention in the vessel, there are one or more similar stirrers in the hopper.

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According to another feature of the present invention the flow of sand between a hopper and a vessel in a core blower is controlled by a valve including a valve member in the form of a sliding plate with a port which, in opening and closing of the valve, is brought into and out of register with further ports in the bottom of the hopper and the top of the vessel; when the valve is closed, the port in the plate lies over a surface which supports sand trapped in that port; and the plate has a resilient ring which forms a seal against a face round the port in the vessel when the valve is closed, and a second resilient ring

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which surrounds the port in the plate and which cleans the face round the port in the vessel when the valve is closing.

5 Preferably when the plate is moved to closed position the vessel is thus raised slightly to compress the resilient ring round the port in the vessel.

10 Preferably the resilient ring which seals round the port in the vessel is an O ring while the resilient ring which surrounds the

port in the plate is of rectangular section with the outer lower corner bevelled away to leave an acute inner lower corner, both rings being secured in grooves in the valve member by an adhesive.

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776,031 COMPLETE SPECIFICATION  
1 SHEET

This drawing is a reproduction of  
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